

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of the application and consideration and entry of this paper are respectfully requested in view of the herein remarks, which place the application in condition for allowance.

I. STATUS OF THE CLAIMS AND FORMAL MATTERS

Claims 1-36 are currently pending and are rejected in the Office Action mailed on July 7, 2009. Claims 1-36 are presently cancelled. Claims 37-86 are new. No new matter has been introduced. Support for this amendment is provided throughout the Specification as originally filed.

II. RECORD OF TELEPHONIC INTERVIEW

Applicants thank Examiner Reese and Supervisory Examiner Siconolfi for the Interview with Applicant's representatives B. McGuire and F. Dour on November 2, 2009. The rejections under 35 U.S.C. § 103 were discussed, as explained in the following comments. Applicants representatives understand that, for the reasons given below, agreement was reached that the amendment overcomes the art of record.

III. REJECTIONS UNDER 35 U.S.C. § 112

Pending claims 34 and 35 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Specifically, the Office Action asserts the tests and test conditions are not identified. As indicated above in the listing of claims, claims 34 and 35 have been cancelled, making moot the rejections. However, in the interests of advancing prosecution, applicants note

that non-limiting exemplary support for new claims 70 and 71 may be found at, inter alia, page 10, ln. 24 to page 11, ln 17.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 112 rejections.

IV. REJECTIONS UNDER 35 U.S.C. § 103

On page 3 of the Office Action, claims 11-6, 10, 12, 15, and 32-36 are rejected under 35 U.S.C. 103(a) as allegedly being anticipated by U.S. Patent Application Publication No. 2002/0015825 to Di Meco et al. ("Di Meco") in view of U.S. Patent No. 7,396,884 to Achten ("Achten")

Claims 7-9 are rejected under § 103(a) as allegedly unpatentable over Di Meco in view of Achten and further in view of U.S. Patent No. 7,056,249 to Osako ("Osako").

Claims 11, 13, and 14 are rejected under § 103(a) as allegedly unpatentable over Di Meco in view of Achten and further in view of U.S. Patent No. 6,945,891 to Knutson ("Knutson").

Claims 16-21, 25, 27, 30, and 31 are rejected under § 103(a) as allegedly unpatentable over Di Meco in view of Achten and further in view of U.S. Patent No. 5,967,922 to Ullein et al. ("Ullein").

Claims 22-24 are rejected under § 103(a) as allegedly unpatentable over Di Meco in view of Achten and Ullein in further view of Osako.

Claims 26, 28, and 29 are rejected under § 103(a) as allegedly unpatentable over Di Meco in view of Achten and Ullein in further view of Knutson.

Applicant respectfully traverses and requests reconsideration and withdrawal of the rejections for at least the following reasons.

New independent claim 37 (see previous claim 1), recites, *inter alia*:

A method of providing a toothed belt for use in an oil-wet environment, the method comprising:

providing a toothed belt and adapting said toothed belt for use in direct contact with oil or at least partially immersed in oil, said belt comprising a body, a number of teeth extending from at least one first surface of said body,...

said body comprising a compound based on a second elastomeric material formed of a copolymer obtained from a dienic monomer and a monomer containing nitrile groups, and

said nitrile groups are in percentage between 33% and 49% in weight with respect to the weight of said copolymer.

New independent claim 52 (see previous claim 36) recites, *inter alia*:

A method of using a toothed belt, the method comprising:

providing a toothed belt comprising:

a body;

...said body comprising a compound based on a second elastomeric material formed of a copolymer obtained from a dienic monomer and a monomer containing nitrile groups, and

said nitrile groups are in percentage between 33% and 49% in weight with respect to the weight of said copolymer; and

using said toothed belt in direct contact with oil or at least partially immersed in oil.

Emphasis added. Applicants respectfully urge that Di Meco and Achten, alone or in combination, fail to disclose or render predictable the above recited features, and that none of the above-cited art of record cures these deficiencies.

Di Meco

Claim 37 recites, **“adapting said toothed belt for use in direct contact with oil or at least partially immersed in oil,”** i.e., an oil-wet environment. Similarly, claim 52 recites, **“using said toothed belt in direct contact with oil or at least partially immersed in oil.”** The

Office Action at page 3, numbered section 5, asserts, *inter alia*, that Di Meco discloses a toothed belt for use in contact with oil. Applicants respectfully disagree. Di Meco discloses a toothed belt with fabric-coated teeth in which the coating fabric increases resistance to abrasion and reduces the coefficient of friction. *Di Meco*, paragraphs [0003]-[0005].

Initially, Applicants note that the Di Meco reference is completely silent on its belt being suitable for use in an oil-wet environment. The Office Action admits as much at page 4 of the Office Action. In fact, the only reference in Di Meco disclosing a resistance to a fluid refers to water as a contaminant, as found in paragraph [0040]. Thus, Di Meco does not disclose, and in fact teaches away from, a belt suitable for operation in a wet environment, such as an oil-wet environment.

Di Meco provides information on a test procedure used to determine belt-duration comparing belts with the resistant layer and those without the resistant layer. *Di Meco*, paragraph [0045]-[0049]. Table 4 presents the test conditions used to determine the improved characteristics of the Di Meco belt over previously known belts lacking the resistant layer. The test conditions do not include any reference to the presence of oil in any form.

In the absence of any reference to operation in a wet environment, particularly an oil-wet environment, the Di Meco specification fails to show or provide any reason for using the claimed belt in a wet environment in general, much less in an oil-wet environment.

Moreover, Applicant submits that the use of the Di Meco belt in an oil-wet environment would have been an inherent contradiction to one of skill in the art at the time of the present invention. Di Meco specifically discloses a resistant coating to reduce the coefficient of friction on the working surface. *Id.*, paragraph [0005]. Because the resistant coating in Di Meco for reducing the coefficient of friction to an acceptably low level as indicated by the successful belt-

duration tests in paragraphs [0045]-[0049], Di Meco would not have sought to use the belt in an oil-wet environment. It is generally recognized that oil-wet environments are used to, among other things, reduce the coefficient of friction on a working surface. Because of the success of the Di Meco belt in reducing the coefficient of friction, further reductions to the coefficient of friction of the working surface, for instance by supplying an oil-wet environment, would have been contrary to the teaching of the reference.

Accordingly, Di Meco fails to disclose **adapting said toothed belt for use in direct contact with oil or at least partially immersed in oil or using said toothed belt in direct contact with oil or at least partially immersed in oil** as required by claims 37 and 52, respectively. Nothing in Achten cures this deficiency.

Achten

Claims 37 recites,” **“adapting said toothed belt for use in direct contact with oil or at least partially immersed in oil,”** i.e., an oil-wet environment. Similarly, claim 52 recites, **“using said toothed belt in direct contact with oil or at least partially immersed in oil.** Claims 37 and 52 also recite: “said body comprising a compound based on a second elastomeric material formed of a copolymer obtained from a dienic monomer and a monomer containing nitrile groups , and **said nitrile groups are in percentage between 33% and 49% in weight with respect to the weight of said copolymer.”** Page 4 of the Office Action concedes that Di Meco does not disclose nitrile groups in a percentage between 33% and 49% in weight with respect to the weight of the copolymer. The Office Action also concedes Di Meco does not disclose a belt adapted to operate in direct contact with oil or partially submerged in oil. Instead, the Office Action asserts Achten provides such a disclosure. Applicants respectfully disagree.

Achten discloses a composition containing a hydrogenated nitrile-butadiene rubber (HBNR), a peroxide crosslinking system, and a resorcinol-formaldehyde resin *as an adhesion promoter*. *Achten*, column 1, lines 7-12 (Emphasis added). *Achten* is directed to a composition which enables HBNR to be vulcanized directly onto a carrier material. *Id.*, column 2, lines 1-4. As for the concentration of nitrile groups in *Achten*, the reference discloses a concentration range of 10%-50%, while claim 37 recites “**nitrile groups are in percentage between 33% and 49% in weight with respect to the weight of said copolymer.**” Applicant submits that the claimed range is specific for belts to be used in direct contact with oil, a use which, like Di Meco, is not contemplated by *Achten*.

Exhibits A-C show test results indicating superior performance of the claimed belt with nitrile concentration within 33% - 49%. As noted in the evidence, nitrile concentration below 33% did not produce the desired technical effect of resistance to the duration tests in oil. Experimental test results indicate a substantial decline in duration test life of belts with concentrations below 33%. Accordingly, the Exhibits show that the claimed range thus achieves unexpected results relative to the prior art range.

The test data also shows the unexpected superior performance in adhesion tests over known belt following dynamic testing in an oil-wet environment. [Exhibit B] Known toothed belts tested under the same dynamic conditions could not be evaluated for adhesion because of the substantial amount of wear they experienced.

One characteristic of toothed belts indicating wear is the measure of the pitch distance line (“PDL”). For instance, Di Meco indicates this test in paragraph [0045], referring to it as a pitch-line distance, or PLD, as an indicator of wear resistance, noting that a smaller variation in pitch line distance over time indicates a greater resistance to wear. Exhibit C shows wear test

results of toothed belts according to the claims. The tests were performed in an oil-wet environment under the test conditions described on pages 10-11 of the instant Specification as originally filed, with the exception of the testing being stopped after 10,000,000 cycles. An ordinarily skilled artisan will recognize, a variation in the Delta 2PDL of less than 1 mm indicates stability of the belt. Applicants' test results indicate a variation in the 2PDL of less than 0.5 mm for the claimed belt, while known belts displayed 2PDL variations of approximately 2 mm. Accordingly, the test results show the claimed belt provides superior wear resistance over known belts tested in an oil-wet environment that was not disclosed or rendered predictable by the prior references. Nothing in the cited references suggests such a result would be achieved with a belt in an oil-wet environment.

Exemplary unexpected advantages of the nitrile group concentration in the range of 33%-49% are, *inter alia*, the optimal performance in an oil-wet environment in terms of lifetime, adhesion force, and wear resistance as determined by Delta 2PDL variation.

Accordingly, Applicants submit that it would not be obvious to modify Di Mecco by Achten to produce a belt for use in direct contact with oil as claimed.

While claimed ranges that lie inside ranges disclosed by the prior art may give rise to a *prima facie* case of obviousness, the parameter must first be recognized as a results-effective variable, i.e., a variable which achieves a recognized result. M.P.E.P. 2144.05 II. B. Applicants submit that neither Di Mecco nor Achten recognize the concentration of nitrile groups as providing resistance to oil for a toothed belt in contact or immersed in oil as claimed. As explained above Di Mecco fails to show operation in a wet environment at all, much less recognizing oil resistance as a results-effective variable. Achten mentions oil resistance in passing at column 4, lines 54-55, and then only to indicate "good resistance to heat and oil" without qualification. There is no

mention of the effect the nitrile group concentration has on the characteristic. Therefore, Achten fails to recognize the nitrile group concentration or the ranges therefor as a "results-effective variable." Consequently, the Office Action has failed to present a *prima facie* case of obviousness through the disclosure of ranges in Achten.

Moreover, even if the Office Action had made a *prima facie* case of obviousness, which it has not, if the claimed range within the range disclosed in the art provides unexpected results, the presumption may be rebutted. As explained at M.P.E.P. 2144.05 II:

Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

As explained above, Achten discloses a nitrile group concentration in the range of 10%-50%, whereas the Exhibits test results indicate a nitrile group concentration less than 33% does not provide acceptable performance which is an unexpected result based on the alleged disclosure of Achten.

Therefore, the claimed range provides results not disclosed or rendered predictable by the Achten reference. Accordingly, the combination of Di Meco and Achten is not obvious.

Next, the Office Action alleges that column 4, lines 51-60 of Achten discloses a HBNR composite having good resistance to heat and oil. Applicant respectfully submits that the reference to "good resistance to...oil" does not suggest that the disclosed composition was tested under the same conditions under which the claimed belt composition was tested. One of ordinary skill in the art, upon reviewing the disclosure in Achten, would not understand the

composition disclosed to be suitable for dynamic applications in an oil-wet environment.

Rather, the Exhibits' test results show that a toothed belt with a body composition according to Achten would not perform successfully in a dynamic oil-wet environment.

To explain, Exhibits A and B indicate unacceptable lifetime and adhesion test results, respectively, for belts having a nitrile group concentration of 28%, which is outside the claimed range. Applicants submit the belt test procedure for resistance to oil prior to the claimed belt was a static test in which a test specimen is immersed in oil for 70 hours prior to examination for rubber hardness and tooth shear. ISO 12046, "Determination of Physical Properties of Synchronous Belt Drives." In contrast, the claimed belt was tested according to the duration test procedure according to Table 1 on page 10 of the instant application. The specific test procedure was chosen to simulate the actual use of a toothed belt within an oil-wet environment. Prior to the present application, toothed belts were not used in direct contact with oil. Consequently, no specific, industry standard dynamic test procedure exists for testing toothed belts in an oil-wet environment. While in some applications, a toothed belt may have occasion to come into occasional contact with oil droplets or oil mist, such belts have a low requirement in terms of oil resistance. Known belts would quickly be destroyed if used in an oil-wet environment.

As explained above, nothing in Di Meco suggests the disclosed belt could be used in an oil-wet environment, and nothing in Achten suggests the composition disclosed would be suitable for a toothed belt subjected to the dynamic testing the claimed belt. Moreover Achten's lower concentrations of the nitrile groups in HNBR provide unacceptable results as determined by the Exhibits' test data. Thus nothing in Achten discloses or renders predictable the claimed ranges, and indeed, Achten leads away from them.

For at least the foregoing reasons, it is believed that revised independent claims 37 and 52 patentably distinguish over the relied upon portions of Di Meco and Achten, either alone or in combination, and is therefore allowable. Independent claims 53 (see previous claim 16), and 69 (see previous claim 32) include features that are similar, or somewhat similar, in scope to the above-discussed features in claims 37 and 52, and are therefore allowable for similar, or somewhat similar reasons. Further, claims 38-51, which depend from claim 37, claims 54-68, which depend from claim 53, and claims 70-86, which depend from claim 69, are allowable as well.

Statements appearing above with respect to the disclosures in the cited references represent the present opinions of the Applicants' undersigned attorney and, in the event that the Examiner disagrees with any such opinions, it is respectfully requested that the Examiner specifically indicate those portions of the respective reference providing the basis for a contrary view.

CONCLUSION

In view of the foregoing, it is believed that the present application is in condition for allowance. Accordingly, Applicants' attorneys respectfully request that a timely Notice of Allowance be issued in this case.

Please charge any fees incurred by reason of this response and not paid herewith to Deposit Account No. 50-0320.

Respectfully submitted,
FROMMER LAWRENCE & HAUG LLP
Attorneys for Applicants

By: 

Ronald R. Santucci
Reg. No. 28,988

Brian M. McGuire
Reg. No. 55,445

Frederick W. Dour
Reg. No. 39,174

Telephone: (212) 588-0800

Facsimile: (212) 588-0500